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(54) APPARATUS AND METHOD FOR PRINTING PRINT IMAGE

(57)Abstract:
PROBLEM TO BE SOLVED: To enable improved printing over an entire area of a sheet by setting a front set and a rear set of wave-shaped ribs to a platen in order to support the sheet passing on the platen from below and providing an ink-absorbing member for absorbing ink drops discharged exceeding an edge.
SOLUTION: When a sheet 16 is fed and transferred by an upper paper guide 28 and a paper feed mechanism 20, a hollow platen 30 having a front set 35 of wave-shaped ribs and a rear set 37 of wave-shaped ribs is set to support the sheet 16 from below as the

sheet 16 passes from an end to an end of a print zone. The platen 30 is provided with a bottom having an outer peripheral part secured by an erect wall 34. An ink-absorbing material sheet 40 is stored in a hollow support area 38. The front and rear sets 35, 37 of wave-shaped ribs are set to project over an edge 36 and the absorbing material 40 by a sufficient height to support the sheet from below as the sheet 16 passes under a print engine 60.

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CLAIMS

[Claim(s)]
[Claim 1] A platen with opening which is the printer for edge-less printing which has a print zone for promoting the regurgitation of the ink droplet to a medium sheet top, is arranged in said print zone, and is demarcated to an edge with a certain wall material set which stands straight, In order to urge formation of edge-less printing the anterior part set of the wavelike rib with which each projects toward a top from said edge in order that said medium sheet may follow on passing through said platen top and may support

it from the bottom, and the posterior part set of a wavelike rib The printer which is equipped with the ink absorption member arranged under said porch in said opening for absorbing the regurgitation exceeding the edge of the ink droplet towards the periphery edge of the sheet accompanying print zone passage of said medium sheet, and changes.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Generally this invention relates to the approach and equipment for printing an image. This invention more specifically relates to the approach and equipment for printing a printing image without an edge.

[0002]

[Description of the Prior Art] There are three fundamental component parts in a conventional-type ink jet print engine, and, generally these are formulated by the serial. These component parts are the service stations for wiping off, or applying a cap and developing those lives, when the ink jet cartridge combined with the ink regurgitation reservoir (spittoon) from which the platen located in a print zone and superfluous printing drops are collected, and a print carriage unit and it is held and a cartridge is not used.

[0003] It is located in a conventional-type ink jet carriage unit, one or more the ink cartridges, i.e., the print head, attached dismountable into it. The carriage unit conforms so that the sweep of the ink cartridge may be carried out for the medium sheet top which moves in the direction which intersects perpendicularly with it motion along with moving trucking. In case a print head passes through a medium top, it turns an ink droplet downward, and it carries out the regurgitation on the medium sheet supported by the platen from the bottom.

[0004] In order to make it the flesh side of a medium sheet not stained with the dirt of ink, ink is breathed out by the front end, the back end, and the both-sides edge part of a medium sheet with the print engine of a conventional type. Thus, the margin part of a sheet is made on a medium sheet, and the regurgitation of the ink droplet by the print head happens to the top face of the platen for support by doing so.

[0005] Although printing of an image with an edge is satisfying enough in almost all applications, the demand of wanting to print an image without an edge came out with the advent of a photograph printer etc. by one side.

[0006] There is the approach of printing an image on the medium ingredient which the lug containing a perforation attached as one of the attempts for getting married to a user and offering printing ****** without an edge. What is necessary is just according to

this means, to only separate a lug from the remaining part of the medium by which the image is printed along with a perforation, when a user desires printing without an edge. Almost all users have separated the lug from the medium using the trimming equipment so that the medium by which the image was printed may not be torn.

[0007] While it was possible to have offered an edge-less printing image by use of the medium into which the perforation went in the ink jet printer, use of such a medium ingredient might require costs and it may have been said that an image valuable when there is no trimming equipment, or when it does not use will be torn. Therefore, an improved new ink jet printer which it is not necessary to use the medium ingredient containing a special trimming equipment or a perforation, and can create a printing image without an edge is desired strongly.

[0008]

[Problem(s) to be Solved by the Invention] The technical problem of this invention is to offer the improved new ink jet printer which performs printing from an edge to an edge.

[0009]

[Means for Solving the Problem] This invention solves the problem about edge-less printing by offering the improved new ink jet printer which performs printing from an edge to an edge. This improved new ink jet printer contains housing for supporting the working carriage unit to which at least one print head cartridge is moved along with the straight-line moving trucking between a maintenance field and a printing field. The platen and the drive of relation are attached in the print zone field in housing. A platen has the bottom where the rim was fixed to the wall which stands straight, and there is a wall to the edge which demarcates the support field of the hollow for holding an ink absorber sheet. The wavelike rib (cockle rib) set with which spacing of a pair opened is arranged at the side which the platen wall of two sheets which is the front wall member and posterior-wall-of-stomach member which demarcate the print zone in a printer faces. A print media sheet follows one wavelike rib set on passing through the print zone field of a printer, and it supports from the bottom, the anterior part, i.e., the head part, of a sheet. The wavelike rib set of another side is followed on print media coming out of a print zone field, and supports a part for the posterior part, i.e., a trailer, from the bottom. The overprint whose controller attached in housing adjusted the sweep actuation between the print zone field of a carriage unit and a maintenance field and injection of a print head cartridge nozzle, and crossed the periphery border area of a medium sheet is performed.

[0010] By reading referring to drawing of attachment of explanation of the example of the following this inventions, probably the method of realizing the above-mentioned description of this invention and them could become clear, and an understanding of this invention itself could also be deepened.

[0011]

[Example] If drawing, especially drawing 1 are referred to first, the ink jet printer 10 for

edge-less printing built based on this invention is shown. although the ink jet printer 10 for edge-less printing can print both an edge and an edge-less printing image on a common medium sheet and ****** and a perforation also explain a detail for a special trimming equipment by the back, if the back end part of a medium is removed -- the need -- there is nothing . According to the new approach of overprinting the edge of the edge of a medium sheet, an edge-less printing image is offered easily quickly.

[0012] The edge-less ink jet printer 10 receives each medium sheet of the medium sheet 16 grade which has passed through the print zone in a printer 10, and contains the housing 12 which has the medium output tray 14 for storing temporarily in it. Although detail is given by the back, it migrates to an edge from the edge of a print zone 18, and the up form guide 28 and the form-feed device 20 of relation support and lead the medium sheet 16, and go it. A medium follows on passing through a print zone 18 at an edge from an edge, and the platen 30 of the hollow which has the anterior part set 35 of a wavelike rib and the posterior part set 37 of a wavelike rib supports it from the bottom.

[0013] Although it understands best when drawing 2 is seen, the platen 30 has the bottom where it was attached in the print zone 18, and the periphery section was fixed with the upright wall 34. There is an upright wall 34 to the edge which demarcates the support area 38 of the hollow made by the dimension which receives the thick ink absorber sheet 40 and which is shown by 36 as a whole. Generally the ink absorber 40 is carrying out the configuration of the letter of a block, and has the height extended to the up border area of the edge 36 of a wall. The anterior part set 35 and the posterior part set 37 of a wavelike rib were followed on passing through the bottom of the print engine 60 with which the medium sheet was attached in housing 12, and in order to support it from the bottom, they are projected on the edge 36 and the absorber 40 in sufficient height.

[0014] The print engine 60 is an ink jet print engine of the conventional type containing the carriage unit 62 attached on the slider rod 64 at working. The carriage unit 62 goes and comes back to the straight-line moving trucking P between the maintenance fields and the print zone fields 18 which are shown by 17 as a whole along with the slider rod 64 under the control which was able to take harmony by the controller 66. The carriage unit 62 has one or more print head cartridges like the print head cartridge 26-27.

[0015] Although a detail is explained by the back, the controller 66 attached in housing 12 adjusts sweep actuation of the carriage unit 62 between the maintenance field 17 and the printing field 18, and the regurgitation of the nozzle in the ink jet print head cartridge 26-27, and overprints across the periphery border area of the medium sheet 16.

[0016] In printing processing, there are two main processing modes, margin mode and the edge-less mode, in the print engine 60. Since processing in margin mode is the thing of common knowledge to this contractor as usual, about the processing step, the detail beyond this is not explained below.

[0017] Next, about processing in the edge-less mode, if a detail is explained referring to

drawing 4 A - drawing 4 C and drawing 5 , in processing in the edge-less mode, a medium sheet like the medium sheet 16 will be pulled out from the form injection tray 13 with the print engine 60. Although it is the most intelligible at drawing 6 , the medium sheet 16 has the edges 42, 44, 46, and 48 of an outside edge, and although separation partial 16A is included, this is separable from the remaining part of the medium sheet 16 by breaking by perforation 16B. Therefore, it separates, and partial 16A is separated from a sheet 16, and the new edge shown in a sheet 16 by 16B is made.

[0018] A sheet 16 is engaged with the medium form-feed device 20 which pulls it to the form path of a printer 10 in order to move the medium sheet 16 from the injection tray 13. The medium delivery device 20 passes the print zone area 18 along with the moving trucking PP of a form, and leads the medium sheet 16 to the output tray 14. print zone field 18 passage of the medium sheet 16 -- following -- a controller 66 -- at least one print head cartridge 26-27 -- up edge drawing 4 A:42 of the medium sheet 16, and flank edge drawing 4 B: -- although a part for the distance of Abbreviation DI is made to spray too many along with 44 and 46, distance DI is about 2mm here. Separation partial 16A of the die length of Abbreviation Wmm is contained in the posterior part edge part of the medium sheet 16 so that it may understand best at drawing 4 C and drawing 6 . Die-length W is the die length by which the drive roller of the form-feed device 20 can fully control separation partial 16A. It breaks because a perforation breaks and there is picking line 16B, and printing to the edge of picking line 16B can be carried out more easily. a sheet 16 -- breaking -- about [from the edge of picking line 16B] -- with [if it is spraying a part for the distance of Dt too much and separation partial 16A will be removed from the remaining part of a print media sheet] no edge from an edge to an edge -- print drawing 6 :50 are done. Distance Dt is about 2mm.

[0019] In order to make it residual ink not adhere to the background of the medium sheet 16, a medium sheet is supported from the bottom with the anterior part and the posterior part sets 35 and 37 of a wavelike rib with which sufficient spacing has opened from there so that the ink absorption sheet 40 may not be contacted. The ink droplet superfluously sprayed from the cartridge 26-27 falls to the direct ink absorption sheet 40, and collects to the not a front face but interior. Therefore, the residual ink with which a sheet 40 is covered contacts the rear face of the medium sheet 16.

[0020] Next, if a detail is explained referring to drawing 2 , drawing 3 , and drawing 5 about a platen 30, a platen 30 adjoins the up form guide 28 with which conveyance to the print zone field 18 of the form-feed device 20 and the print media sheet 16 is assisted, and is attached. Although it is the most intelligible at drawing 4 A, the anterior part set 35 of a wavelike rib gears with the up edge 42 as the print media sheet 16 approaches the print zone area 18, the front front face of them as shown by 96 is made to meet, and it lets it slide to the top-most vertices of each wavelike rib under set 35. Since a form-feed device advances a sheet 16 continuously and the anterior part set 35 top of a wavelike rib is made to cover, a sheet 16 will be supported from the bottom and

a rib does not need to be exposed to superfluous spraying from a print head 26-27. When a sheet 16 moves in accordance with the form path PP, a controller 66 stops a sheet 16, so that it may understand best at drawing 4 A and drawing 4 B, and image printing of the upper part and a flank edge may become easy and the head edge of a sheet 16 may be positioned. If a sheet 16 is carried forward along with the moving trucking after that, a sheet will be in the condition that came to the location drawn on drawing 4 C, and the back part of a sheet 16 supported from the bottom in the posterior part set 37 of a wavelike rib. If a sheet 16 is stopped in the location drawn for example, on drawing 4 C, the back end section of a sheet 16 separates, and separation partial 16A of a perforation is separated from a sheet as it is sprayed to the first transition of partial 16A, the image 50 from an edge to an edge will complete a controller 66.

[0021] Next, if the detail of the anterior part set 35 of a wavelike rib is explained referring to drawing 2 - drawing 5 , the anterior part set 35 of a wavelike rib contains the wavelike rib 84-94 with which two or more regular intervals stand straight. Similarly, the posterior part set 37 of a wavelike rib also contains the wavelike rib 72-82 with which two or more regular intervals stand straight. The antipode of the posterior part set 37 of the wavelike rib 72-82 has the anterior part set 35 of the wavelike rib 84-94. The distance between the anterior part set 35 of a wavelike rib and the posterior part set 37 is chosen so that even the anterior part set 35 of a wavelike rib may reach without contacting sheet first transition to an absorber and what kind of print media sheet can also be enough supported from the bottom with the posterior part set 37. Similarly, further, the distance chooses the distance to which the trailing edge of a print media sheet does not contact an absorber 40, after support by the posterior part set of the wavelike rib 84-94 is lost. Probably, it will be clear to this contractor to go into the true range of this invention, even if it is other configurations, although this is the configuration that a wavelike rib set is recommended. therefore, under a predetermined set [like a set 35] whose wavelike rib is -- regular intervals -- you may not be -- moreover -- or it does not matter even if the wavelike rib in anterior part and the posterior part set 35, and 37 is shifted mutually.

[0022] Next, if the wavelike rib 72-82 and the detail of 84-94 are explained referring to drawing 2 and drawing 4, since the wavelike rib 72-82 and 84-94 are substantially the same mutually, below, they will explain the detail of only the wavelike rib 94. About this, the wavelike rib 94 is projected toward the top from a part for sufficient distance to be connected with the wall 34 and one which stand straight, and prevent the contact to the absorption block 40 of the print media sheet 16, and there. It has the upper part 96 where the moving trucking which passes along the wavelike rib 94 in case print media goes into a print zone 18, the base of the letter of a block and inclines toward a top in an opposite direction, and serves as a taper. The upward inclination of a rib 94 is the important description in which the first transition of a sheet 16 is urged to lifting by that cause, it leads to the top-most vertices of a rib, and the distance from the absorber 40 of

a sheet is kept from the maximum distance of the height of the whole rib 94.

[0023]

[Table 1]

表 I

材料のタイプ	厚さ	ライフサイクルにおける シート数	故障前の印刷数	注目すべき故障のタイプ（識別された故障原因）
サンプル1 Cotton Fiber Absorbent Ahlstrom グレード：320 100% 綿繊維 基本重量：720g/m^2 流量：220ml/min ウェットバースト：H_2Oにおいて２０ 毛管上昇：１分間に79mm	未知	６０００	４０００	シートの裏側についたインクの小さな点。小さな点は媒体を傷つけること無く容易にブラシで取ることができる。（インクのひげは吸収材の上部表面から蓄積し、媒体の裏面に付くのは断たれる。
サンプル２ POREX Technologies X-4894媒体シート 45-90 μ 界面活性剤なし	未知	６０００	４５００	少量のインクが小さなしみの形で媒体の裏側に伝えられる。（吸収材の表面から蓄積されたインクは充分媒体の裏側に接触する。）
サンプル３ サンプル２と同じ	未知	６０００	５０００	少量のインクが線の形で媒体の裏側に伝えられる。（吸収材の表面から蓄積されたインクは充分媒体の裏側に接触する。）

[0024] In order to check the dependability of a printer 10, the set of the same printing image was printed using a different class and the ink absorber of thickness, and a series of trials were performed to coincidence. Table I summarizes the result of various trials.

[0025] Next, reference of drawing 7 shows the ink jet printer 100 for edge-less printing built based on this invention. This ink jet printer 100 for edge-less printing is the same as that of a printer 10 substantially except for the point that it is not necessary to use the medium material into which it got married and the sheet cutter with an edge-less special printing image and the perforation went, and can print on a common medium sheet. In short, the medium sheet which must cut off a trailing edge is not needed. In order to realize printing of an edge to an edge, a printer 100 helps for this to convey the medium sheet 116 along with moving trucking to an output tray like print zones 118-14 including the anterior part set of the further motorised drive roller 102.

[0026] The drive roller 112 of processing of a printer 100 is the same as that of a printer 10 substantially except for the point of carrying forward a sheet 116 by distance sufficient since the trailing edge 148 of a sheet is sprayed too much by the ink jet nozzle 127 of a print head 126 to a print zone 118. Although a nozzle 127 performs excessive spraying for distance d minutes to a trailing edge 148 so that it may understand best at drawing 7 , distance d is about 2mm here. Although it is clear to this contractor, it cannot be overemphasized that may be shorter than 2mm according to the size and form thickness of print media which a printer 100 treats, or distance d may be long.

[0027] Although indicated about the specific example of this invention, various

different modification is possible and it is clear that their it can plan in the true pneuma of an attachment claim and the range. Therefore, a wavelike rib may be close spacing by the longitudinal direction. Instead, the set of a wavelike rib may be prolonged towards the top from the bottom of a platen so that it may become closer spacing in other directions. In this configuration, the hole for ribs is needed for an absorber. Finally, some are possible also for elongation and the combination of the wavelike rib that other things are extended from the bottom of a platen, from the edge of a wall. Anyway, if a wavelike rib is arranged to a bottom field, in order to prevent contamination by excessive spraying to the rib in the condition of not being covered, it will be clear to this contractor that the field which can be sprayed excessive will be restricted inevitably. The above is not what meant limiting to the specific epitome or specific indication of presentation to this application.

[0028] As mentioned above, although the example of this invention was explained in full detail, the example of each embodiment of this invention is shown hereafter.

[0029] It is the printer for edge-less printing (10) which has a print zone (18) for promoting the regurgitation of the ink droplet to a [embodiment 1] medium sheet (16) top. A platen with opening which is arranged in said print zone (18) and demarcated to an edge (36) with a certain wall material set (34) which stands straight (30), The anterior part set (35) of the wavelike rib with which each projects toward a top from said edge (36) in order that said medium sheet may follow on passing through said platen (30) top and may support it from the bottom, and the posterior part set of a wavelike rib (37), The ink droplet turned to the periphery edge of the sheet accompanying print zone (18) passage of said medium sheet (16) in order to urge formation of edge-less printing, The printer which is equipped with the ink absorption member (40) arranged under said edge (36) in said opening for absorbing the regurgitation exceeding an edge, and changes.

[0030] [Embodiment 2] With the migration covering the print zone of said medium sheet (16) in the anterior part set (35) of said wavelike rib, the first transition (42) of said medium sheet (16) contacts substantially, and that it seems that there is nothing to said ink absorption member (40) A part for sufficient distance to carry out, The printer for edge-less printing given in the embodiment 1 characterized by having the wavelike rib (84-94) which kept spacing at which the plurality which projects above stands straight, and consisting of said edge (36) (10).

[0031] [Embodiment 3] With the migration covering the print zone of said medium sheet (16) in the posterior part set (37) of said wavelike rib, the part (16) of the last of said medium sheet (16) contacts substantially, and that it seems that there is nothing to said ink absorption member (40) A part for sufficient distance to carry out, The printer for edge-less printing given in the embodiment 1 characterized by having the wavelike rib (72-82) which kept spacing at which the plurality which projects above stands straight, and consisting of said edge (36) (10).

[0032] [Embodiment 4] Printer for edge-less printing given in the embodiment 2 characterized by the wavelike rib (84-94) with which said plurality stands straight being separated at equal intervals (10).

[0033] [Embodiment 5] Printer for edge-less printing given in the embodiment 2 characterized by the wavelike rib (84-94) with which said plurality stands straight being separated by non-regular intervals (10).

[0034] [Embodiment 6] Printer for edge-less printing given in the embodiment 3 characterized by the wavelike rib (72-82) with which said plurality stands straight being separated at equal intervals (10).

[0035] [Embodiment 7] Printer for edge-less printing given in the embodiment 3 characterized by the wavelike rib (72-82) with which said plurality stands straight being separated by non-regular intervals (10).

[0036] [Embodiment 8] Printer for edge-less printing given in the embodiment 1 characterized by for the anterior part set of said wavelike rib and the posterior part set of said wavelike rib setting spacing, receiving mutually, and arranging them exactly the other way around (10).

[0037] [Embodiment 9] the anterior part set of said wavelike rib (84-94) and the posterior part set of said wavelike rib (72-82) It is characterized by urging lifting of said sheet (16) that it is put on maximum distance from said absorber (40) in case said medium sheet (16) moves over a print zone (18) including the upper part used as a taper as it goes upwards respectively. The printer for edge-less printing given in an embodiment 1 (10).

[0038] It is the approach of [embodiment 10]-edge-less printing, and is the step to which a medium sheet (16) is moved over the print zone (18) where the platen (30) has been arranged in it. The step to which said platen (30) has opening demarcated to the edge (36) with the set (34) of a certain wall material which stands straight, and by lifting said sheet (16) from the bottom and taking sufficient distance from said edge (36) The ink droplet turned to the periphery edge part of said sheet (16) with print zone (18) passage of said medium sheet (16), The step which separates said sheet (16) from the ink absorption member (40) arranged below said edge (36) in said opening substantially in order to absorb the regurgitation beyond an edge, The approach which is equipped with the step which breathes out two or more ink droplets to the periphery edge (42, 44, 46, 48), and promotes formation of edge-less printing according to print zone (18) passage of said medium sheet (16), and changes.

[0039]

[Effect of the Invention] As explained above, the improved new ink jet printer which performs printing from an edge to an edge can be offered by using this invention.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective diagram of the edge-less ink jet printer built based on this invention.

[Drawing 2] It is the perspective diagram of the platen attached all over the print zone of the ink jet printer of drawing 1 .

[Drawing 3] It is another perspective diagram describing the platen in the condition of having removed the up form guide and form-feed device of relation in drawing 2 .

[Drawing 4 A] It is drawing describing the step of the overprint of a print media sheet for offering the image without an edge created based on this invention.

[Drawing 4 B] It is drawing describing the step of the overprint of a print media sheet for offering the image without an edge created based on this invention.

[Drawing 4 C] It is drawing describing the step of the overprint of a print media sheet for offering the image without an edge created based on this invention.

[Drawing 5] It is the plan of the outline of the platen of drawing 2 .

[Drawing 6] It is the schematic diagram of the print media sheet printed without the edge based on the approach of this invention.

[Drawing 7] It is the schematic diagram of other printers for edge-less printing built based on this invention.

[Description of Notations]

10: The printer for edge-less printing

16: Medium

18: Print zone

30: Platen

34: Wall material of a platen

35: The anterior part set of a wavelike rib

36: The edge of a platen

37: The posterior part set of a wavelike rib

40: Ink absorption member

42, 44, 46, 48: The periphery edge of a medium

72-82, 84-94: Wavelike rib